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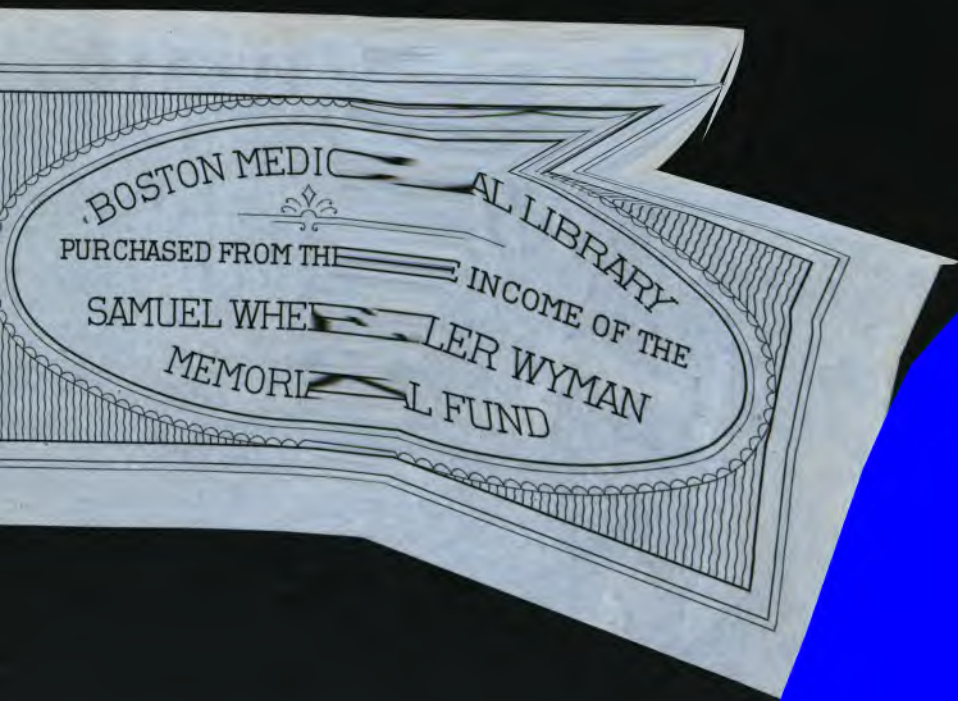
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CARCINOMA OF THE RECTUM

F. SWINFORD EDWARDS



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With the Author's

kindest regards:

CARCINOMA OF THE RECTUM



CARCINOMA OF THE RECTUM

ITS DIAGNOSIS AND TREATMENT

BY



F. SWINFORD EDWARDS, F.R.C.S.

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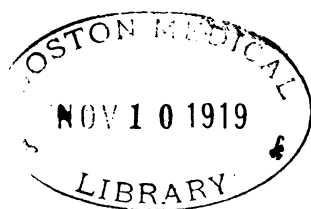


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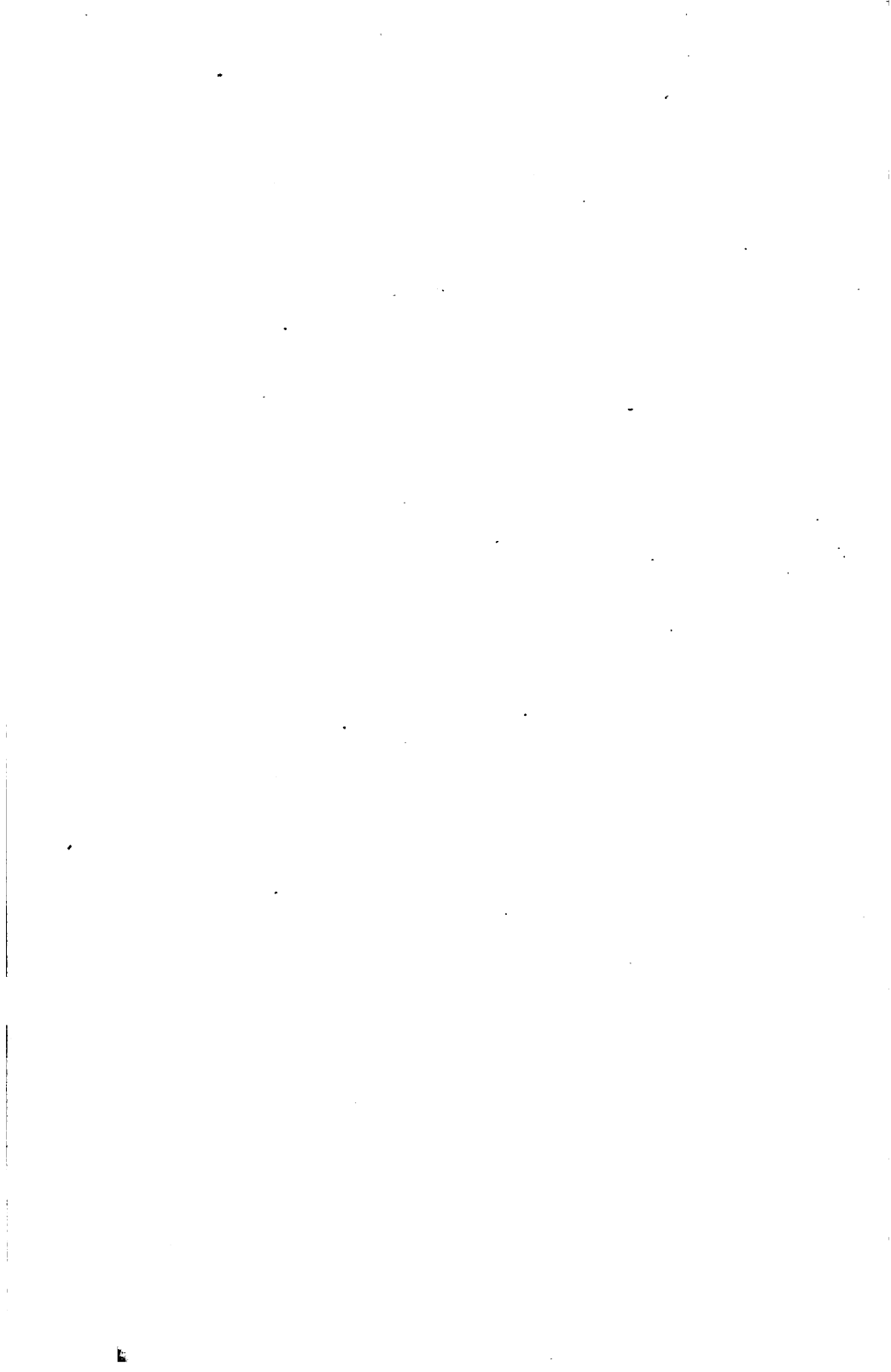
PREFACE

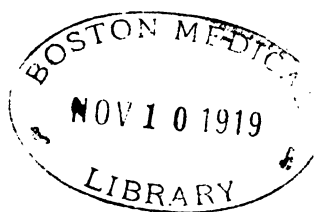
So great has been the advance in the surgical treatment of carcinoma of the rectum during recent years, that I have been tempted to place before the medical profession, briefly, in the following pages, my experience of this disease, with the results obtained by operations for the removal of the growths by the sacral route, based upon forty consecutive cases. In each of them upwards of eighteen months have elapsed since the operation was performed.

F. SWINFORD EDWARDS.

55, HARLEY STREET, W.

June, 1905.





CARCINOMA OF THE RECTUM

CARCINOMA of the rectum rarely occurs before the age of forty, and although I have seen several cases under thirty, each of these was of a rapidly growing and highly malignant type. It is more prone to occur in males than in females. Hæmorrhoids, fistula, and fissure of the rectum probably form predisposing factors to the development of cancer in that region. I can call to mind two instances of a villous tumour of the rectum subsequently undergoing malignant changes, and I have had under my care a case of malignant adenoma which appeared to start from a pre-existing fistula, whilst two cases of epithelioma of the anus certainly originated in fissure.

The most common *site* for carcinoma to commence in the rectum is from 2 to 3 inches from the anal margin, although any portion of the lower bowel may become affected. Commencing in the epithelial elements of the mucous membrane, the disease progressively infiltrates the tissues of the rectal wall, and ultimately reaches the perirectal tissues. Should it involve the peritoneal coat, it may set up a cancerous peritonitis or become adherent to, and finally involve, other viscera, such as the bladder, or other parts of the intestinal canal. When it spreads to the cellular tissue below the peritoneal reflection it fixes the rectum in the sacral concavity, becomes adherent to the vagina in the female, and, by its pressure

upon the nervous structures, gives rise to severe pain. The lymphatic system becomes involved, the rapidity of infection depending upon the variety of the disease, first making itself evident in a thickening in the position of the lymphatic tract passing from the rectum to the lateral pelvic walls. Enlargement of the lymph glands is first noticed in the pelvic group, in the hollow of the sacrum along the posterior rectal wall, and later in the pelvic and lumbar groups. The inguinal glands are only affected in cancer involving the anal margin, or late in the disease in association with its general dissemination.

Secondary deposits of cancer are most frequently found in the liver, and, in accordance with the general rule, the metastatic tumours reproduce the histological characters of the primary growth.

Varieties.

1. Columnar-celled or adeno-carcinoma.
2. Squamous-celled epithelioma.
3. Scirrhus.
4. Colloid carcinoma.

Of these forms, the columnar-celled carcinoma is by far the most common, the histological appearance being, in brief, a mass of epithelial tubules infiltrating the layers of the rectal wall and surrounded by a small-celled exudation. The squamous epithelioma is more uncommon, and it is most frequently found when the growth primarily attacks the anal margin. Scirrhus of the rectum is rare, but in my series of forty cases one was found to present histological features of this variety, the tubules of epithelial cells being enclosed in a dense fibrous stroma. Colloid carcinoma occasionally occurs as a degenerative change in a cancer.

Whatever the histological appearances of the growth

may be, carcinoma of the rectum progressively and gradually spreads. Commencing in the epithelial tissues as a small button of growth, the affected area becomes thickened and infiltrated, and the mass tends to spread laterally rather than upwards or downwards. In the earliest stages of the disease there is no symptom to call the patient's attention to the part, but as it advances the symptoms become manifest, the clinical features differing slightly according to the variety of the disease. Thus, with the progressive advance of the disease, the tissues of the rectal wall become infiltrated and the growth is at first freely movable as a whole ; but after a time the surface of the growth gives way, leaving a ragged ulcer with characteristic, friable, infiltrated borders. In the relatively more quickly growing adenoid cancers it is more usual for the growth to sprout out from the surface and to form distinct tumours projecting into the lumen of the rectum. These are easily recognised when within reach of the examining finger, and indeed, are most commonly met with in this form. In the more slowly growing types there is progressive infiltration rather than fungation ; the base of the growth becomes thickened, constricted and puckered ; the surface presenting a ragged ulcer with everted, hard but friable margins.

Symptoms.

The symptoms of cancer of the rectum depend upon the type of the growth, its site and the stage of the disease. The symptoms at the onset are usually so slight and of such an indefinite character that valuable time is allowed to elapse, and it is not until pain or bleeding from the rectum occurs that the patient seeks advice. Frequently patients are found upon the first examination to have already an extensive carcinoma of the

rectum when the local symptoms do not point to the serious nature of the disease, although they may recall that for some months they have noticed indefinite griping pains and often constipation. I would here urge the practitioner to make it an invariable rule to undertake a digital examination of the rectum whenever he is consulted by a patient, within the cancer age, complaining of indefinite abdominal or rectal disturbances.

The change first noticed is a sense of uneasiness in the lower bowel, followed sooner or later by slight diarrhœa, which is generally most troublesome in the morning, when, after the first evacuation, the patient feels that there is more to come away, and has to return to stool. At this time the motions become streaked or mixed with mucus, and may contain in addition blood. Bleeding is a symptom that is rarely absent, but, on the other hand, is seldom severe, and, when present, may be taken as an indication that the surface of the neoplasm has commenced to break down. The muco-purulent discharge is at first white, but later becomes darker and often extremely foetid.

Diarrhœa, a symptom frequently complained of, is usually of a spurious nature. In the adenoid fungating form of cancer the patient is troubled with frequent desire to defæcate, even, perhaps, soon after the passage of a satisfactory motion, and on each occasion passes flatus and mucus, with or without blood. This frequency is usually noticeable in the morning, and seems provoked by exercise, but the contrary may be the case. *Constipation*, on the other hand, is the more frequent symptom with the infiltrating form of cancer, in which the lumen of the bowel is actually encroached upon, with the attendant symptoms of intestinal pains, malaise, and sacral aching, and it may be the first symptom of the rectal disease.

I have seen, however, constipation due to the exuberant growth of an adenoid cancer when the bowel had become obstructed by the contained mass; but this must be regarded as unusual. Constipation going on to acute intestinal obstruction is uncommon in rectal carcinoma, but much more frequent in disease of the sigmoid, where the infiltrating cancers predominate.

Pain in cancer of the rectum is a symptom depending in a large measure upon the site of the disease. When the growth is low down and involving the anal canal, pain is an early and marked symptom, owing to the abundance of cutaneous nerves present and the constant movement of the part. The pain here is especially marked during the passage of a motion, but in the later stages of the disease is more or less constant, and may prevent the patient getting any comfort whilst sitting down. Further than this, if the sphincter muscle is actually infiltrated, and in consequence unable to contract, incontinence of fæces may result, increasing the patient's misery. In the more common cases, in which the growth commences in the bowel above the anal canal, pain is less marked, and often does not attract the patient's attention until comparatively late in the disease, although discomfort in the lower bowel may be complained of. With the progressive advance of the disease, pain of a stabbing or shooting character is found, whilst later still, a dull constant aching in the lower part of the back, sacral base, and thighs denotes the extension of the disease into the peri-rectal tissues, and is due to pressure upon, or direct implication of, the nerves in the sacral concavity. Further, pain at this stage may be due to direct carcinomatous infiltration of neighbouring organs, such as the bladder, when other symptoms peculiar to the organ will be added, especially if the disease has progressed so far as to produce

Carcinoma of the Rectum

a fistula and to allow the passage of fæces into the bladder or of urine into the rectum.

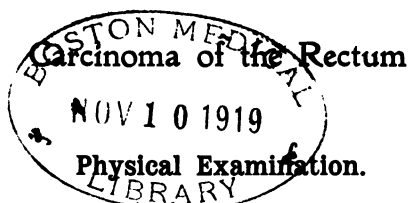
Partial obstruction to the intestinal contents by the growth, with the associated increased effort to overcome this, is accompanied by pain of a griping nature.

Edema of either leg is a symptom not uncommonly present in the later stages, and is of grave import, indicating an involvement of the iliac vein in the disease.

Constitutional symptoms, in which the cachexia common in carcinoma is included, occur at a variable period after the onset of the disease, depending in part upon the loss of blood and mucoid discharge, and in part upon the relative malignancy of the growth. Loss of sleep from pain, the knowledge of the patient that he is suffering from an irremovable cancer, and perhaps also the liability of these patients to gastric disturbances with lack of proper assimilation of food, will form additional factors.

These constitutional symptoms are frequently aggravated by mild toxæmic conditions arising from the absorption of septic products at the seat of the disease. These patients are subjected to slight headaches and malaise, complain of lack of energy, and often have a slightly raised temperature. More uncommonly there may be a true septic condition from the formation of abscesses in the tissues surrounding the growth, and the surgeon must always bear in mind that an ischio-rectal abscess may originate from a rectal carcinoma.

Metastatic deposits of the growth are most frequent in the liver, which becomes enlarged, and may or may not be accompanied by jaundice. The organ can be felt, if the abdominal wall allows of sufficient palpation, to be enlarged irregularly, and sometimes distinct rounded masses can be felt in it.



Whenever a patient of middle age presents symptoms in any way suggestive of a rectal carcinoma, a digital examination of the bowel should be insisted upon. So slight may be the symptoms in the early stage that the patient often thinks he is suffering from diarrhoea, or even from hæmorrhoids, and no definite opinion as to the cause of his trouble can be given until a complete examination has been carried out. A growth within three or four inches of the anal canal can be reached by the finger in the rectum, but much depends upon the position of the patient during the examination. In the female I examine with the patient in the left lateral decubitus, but in the male in the genu-pectoral position, whilst an additional inch of the bowel can be examined by putting the patient in a squatting posture, and asking him to strain down as if at stool. Frequently, to obtain a satisfactory examination, it is necessary to give the patient a general anæsthetic, especially when the growth attacks the upper part of the rectum or is very painful from involvement of the anal canal. When under an anæsthetic, I examine the patient in the lithotomy position, so that the examining hand is not impeded by the buttocks, and the abdominal muscles are rendered lax by the tilting of the pelvis. In this manner, also, a bimanual examination can be carried out, and the amount of mobility of the growth more easily ascertained, whilst a high-lying growth can often be pushed down from above within reach of the examining finger. The condition of 'ballooning of the rectum,' also a patulous condition of the anus, may be found in cases of high-lying rectal cancer.

It is in these cases of disease situated out of reach of the examining finger that I find most use for the *proctoscope*. The particular instrument that I am in the habit of using is known as Strauss' æro-proctoscope, by means of which the rectum can be distended with air and each part brought under immediate inspection. The patient is put into the genu-pectoral position, and a tube of 1 inch calibre and 12 inches in length is fitted with a blunt obturator and introduced into the rectum for about 3 inches. The obturator is withdrawn, and the lamp, mounted on a long rod fitted into the glass window to block up the proximal end of the tube, is inserted. The light having been turned on, the rectum is distended with air from the rubber bellows, and the tube gently pushed on into the lumen of the bowel under direct guidance of the eye. By this means, and by varying the position of the orifice of the tube, the whole length and calibre of the rectum and sigmoid can be examined, and the position of any disease accurately ascertained, and this, moreover, without the use of an anæsthetic.

During the physical examination of the rectum several points must be considered, upon which the question of treatment entirely rests. First, the actual position of the growth is localized, and its nature, whether of the fungating or infiltrating type, ascertained. Secondly, the length of the affected portion of bowel is noted, particular attention being paid to the mobility or otherwise of the growth upon the surrounding tissues, which indicates the amount of direct extension of the disease and of its adhesion to neighbouring structures. At the same time any lymphatic infiltration should be sought for in the planes of lymphatic extension.

In the female additional evidence may be obtained by vaginal examination, the limitation of the growth being

sometimes more easily determined through the recto-vaginal septum. The freedom, or not, of the uterus can also be ascertained.

Differential Diagnosis.

Cancer of the rectum may be mistaken for non-malignant stricture, for syphilitic disease, for innocent growths in, and for tumours external to, the bowel. The *simple or non-malignant stricture* may result from traumatism, tubercle or dysentery, or from venereal disease. The discharge associated with simple stricture is slight in amount and seldom blood-stained, nor is pain a prominent symptom. The surface of the simple stricture is usually smooth, but the mucous membrane is adherent, not moving freely over the subjacent tissues, and generally appears to be funnel-shaped from below. The lower margin of a carcinomatous stricture is hard, raised and nodular, and sometimes protrudes into the bowel, resembling a diseased os uteri as felt *per vaginam*.

If during the examination any thickening can be felt in the lymphatic tract, or any enlargement of the glands noted, these form very strong points of evidence in favour of malignant disease.

Syphilitic disease of the rectum is in my experience uncommon, and I think that many cases included under this heading really result from gonorrhoea and chancroidal ulcerations of the anal canal, especially in women. Tertiary syphilis of the rectum may occur, and ulceration ensue from the breaking down of gummatous deposits. In more advanced cases stricture may result, but a history of syphilis and indications of the disease in other organs would probably be found.

The *innocent tumours of the rectum* that might be confused with carcinoma are the papillomata, single and multiple, and the pedunculated fibromata. These tumours usually occur in younger life, and their symptoms extend over a much longer time. They are soft and elastic to the touch, not firm and friable as in carcinoma. A distinct pedicle can often be felt, and the mucous membrane at the point of attachment is not found indurated. Another tumour sometimes mistaken for carcinoma is the rectal villous tumour. This occurs in adults as a tumour, often attaining large size, with a short, broad pedicle, and is particularized by the abundant, glairy, white-of-egg-like discharge which it causes. These tumours are probably innocent, but tend to recur after removal, and in one of my cases was certainly followed by carcinoma.

Tumours pressing upon the rectum from without have occasionally been mistaken for carcinoma recti from the symptoms of tenesmus and of partial obstruction to which they give rise, but these symptoms are often due to peri-rectal infiltration from inflammatory conditions. I have had the opportunity of seeing two of these cases of stricture due to peri-rectal cellulitis. One of these was actually operated upon by a well-known surgeon in mistake for malignant disease, whilst in the other, during the course of an operation for relief of the stricture, I opened a residual abscess outside the rectal wall after having excised the coccyx. These cases may present great difficulty in diagnosis, although on examination the rectal mucous membrane will usually be found healthy, even if adherent to the underlying mass.

Treatment.

The treatment of carcinoma of the rectum is perhaps one of the most difficult problems a surgeon has to face. So various are the degrees of the growth when the patient is first examined, that numerous points have to be decided by the surgeon before a definite line of treatment can be entered upon, and these can be briefly summarised thus—

1. What chance is there of complete cure by extirpation?

2. Provided the growth can be removed, will the patient's life be prolonged and his pain relieved?

3. Or would similar ends be obtained by palliative measures, such as curettage, irrigation, or colotomy?

Previous to the introduction of aseptic surgery, the immediate mortality from operations to remove rectal cancers was extremely high, but with the great advance in surgical technique this has been much reduced. Statistics drawn from the practice of any one individual surgeon as to the success of this operation must in a large measure depend upon that surgeon's selection of cases, for, obviously, one who operates only on early cancers would hope for better results, so that figures are misleading; but in a series of consecutive operations for extirpation of rectal cancers which I have performed, I have only excluded cases which from the first were deemed inoperable, with an immediate mortality of 7·5 per cent. (3 in 40 cases), one death being due to peritonitis, one to septicæmia, and the remaining one to exhaustion four days after the operation, whereas the mortality in nearly 1,600 cases collected from literature amounts to over 20 per cent. (Tuttle). Unfortunately, however, recurrence of the growth *in situ* is only too frequent, and in my series of cases twelve were known to have recurred

within four years (three within one year, eight after one year, and one after three years). But bearing in mind that the disease is fatal if allowed to run its course, usually within a year, I hold that any operative procedure which brings a chance of a radical cure, or which, at all events, prolongs life for two or three years, especially with freedom from pain, must be considered in a favourable aspect. Consider for a moment the comparative results in cases subjected to removal of the growth with those treated by palliative means. Whilst the operation of extirpation offers a chance—small it may be—of complete recovery, it, at all events for a time, gives the patient freedom from pain and from the troubles depending upon diarrhœa, hæmorrhage, and rectal discharge, whereas palliative measures, with the exception of colotomy, give little relief. Certainly, in most cases in which colotomy has been performed the patient improves in his general condition during the early months from the reduction of the septic absorption, diarrhœa and constant tenesmus, but it offers no hope in the shape of a cure, and death usually ensues within eighteen months. No proof can be found for the statement often made that a colotomy retards the direct or metastatic extension of the rectal cancer by diverting the passage of fæces from over it, *but there is no doubt of its value towards the relief of the patient's pain.*

Cases suitable for Excision.—The chief point to be ascertained before advising a radical operation is *the relation of the growth to the surrounding tissues* and its consequent mobility. If the growth is felt upon examination to be movable, it is probably confined to the rectal wall; but if any impairment in mobility is found, suspicion is at once aroused that direct extension of the growth has taken place through the rectal wall to the surrounding tissues. Some cases, however, remain in which the

mobility is only slightly impaired, and the question as to the advisability of attempts at removal becomes more difficult. Personally, if the growth is fixed only posteriorly and there are no symptoms directly referable to the implication of nerve structures, I advise an operation, for the extension of the disease can be removed with the primary focus by the posterior operation and the whole area infiltrated with cancer extirpated. Where, on the other hand, fixation has taken place towards the anterior aspect of the bowel, complete removal becomes more difficult, owing to the infiltration of other pelvic viscera, such as the prostate and bladder in the male, and the vagina and uterus in the female. Although portions of these organs may be removed with the growth, the chance of a radical cure becomes remote, and I would only undertake such an operation at the urgent wish of the patient after the whole matter had been fully explained to him or her. It is said, however, that the growth may become adherent to the surrounding tissues by simple inflammatory processes without any direct spread of the carcinoma.

The *position of the growth* has little influence in regard to the advisability of an operation for its removal, other things being suitable, but rather to the particular form of operation to be performed. Thus, a growth commencing in the anal canal can be satisfactorily removed by the perineal operation; a growth situated between the third sacral vertebra and the upper border of the external sphincter, by the trans-sacral route; whilst a growth above this may require a laparotomy for its removal. It is in these cases that a laparotomy is advised, partly as an exploratory operation to learn the extent of the growth and of the lymphatic infiltration, and partly with a view to proceed to the radical operation if feasible.

Symptoms of intestinal obstruction contra-indicate an immediate operation for removal of the growth, the surgeon's efforts being directed towards the relief of the obstruction, the question of extirpation of the growth being reserved for a later period.

The *general condition of the patient* is a factor to which must be given full consideration before undertaking such an extensive operation as rectal extirpation, for patients are met with in whom the local conditions are favourable, but who from weakness, digestive troubles, etc., could not stand the strain of a severe operation. In these patients a fortnight or three weeks spent under observation, with good feeding and the palliative measures described below, may make all the difference between an unsuitable and a suitable case for operation.

Metastatic deposits of the disease, most usual in the liver, contra-indicate any operation for the removal of the growth.

Palliative Treatment.—It will be readily seen from the foregoing that cases may come under observation for the first time wholly unsuitable for a radical operation, when the surgeon will be required to advise measures to relieve the patient of his sufferings from pain, tenesmus, etc.; as the same measures must be employed in the stage of preparation for operative interference, I shall describe them first. They consist of diet, irrigation, curettage, colotomy or entero-anastomosis, and drug treatment.

In the matter of *diet* attention should be directed towards the giving of food easily assimilated and leaving as little solid residue as possible. The patient should be given small quantities, frequently repeated, of milk, meat-extracts, and predigested food. Starches and fibrous vegetables should be interdicted. By these means the digestive apparatus, so often at fault in these cases,

becomes much improved, and the patient gains in weight and strength.

Irrigation of the lower bowel is very useful in checking the absorption of septic products from the surface of the growth, especially in cases in which there is much discharge. The solutions I am in the habit of using are boracic acid, chinisol 1 in 600, and permanganate of potash. A small rubber rectal tube is passed well into the bowel whilst the patient is in the lateral decubitus with the hips well raised, and the fluid allowed to run slowly in from an irrigator can. It will find its way above the growth, and effectually wash out mucus, blood-clot, pus, and fæces.

Curettage can be occasionally employed in those cases in which frequent hæmorrhages are found to proceed from exuberant masses of growth projecting into the lumen of the rectum, or, again, when the latter are causing symptoms of obstruction. The anal sphincter is dilated, and the fungating masses removed by curettage with a large Volkmann's spoon, the bowel being then irrigated with hot boracic lotion or hazeline to arrest hæmorrhage.

This small operation is, however, not unattended by danger, for, owing to the great friability of the growth, the rectal wall may become lacerated, and infection by sepsis of the peri-rectal cellular tissue or of the peritoneal cavity occur.

Drug treatment is directed towards—

(a) The relief of pain by opium, nepenthe, morphia or belladonna administered by the mouth or in the form of suppositories.

(b) Producing a free and daily action of the bowels by cascara, pulv. glycyrrh. co., ol. ricini, or aperient salines.

(c) Intestinal antiseptics: salol, charcoal, β -naphthol and the like.

Colotomy in Carcinoma of the Rectum.—The formation of an artificial anus in order to divert the current of fæces from passing over the growth may be urged for the following reasons :

1. To relieve the pain and distressing diarrhoea in these cases.
2. As an immediate treatment of intestinal obstruction.
3. As a preliminary measure to extirpation of the growth.

Considering first the operation purely as a palliative measure when complete removal of the growth is deemed impossible, the question naturally arises as to the most opportune time in the stage of the disease for the performance of the operation. In those cases of low-lying growth in which pain and rectal tenesmus are the marked features, there can be no doubt that the sooner colotomy is performed the better, as great relief to the patient will be thereby obtained, but where the growth exists in the middle portion of the rectum, the diminution of pain by the operation is not so marked, as here we are dealing with a direct implication of nerve structures. However, the advantage gained by the decreased rectal discharge, the lessened hæmorrhage and the improvement in the patient's general health, are all factors in favour of colotomy. Personally I do not agree with the prevalent idea that an artificial anus is a disgusting nuisance to a patient, for with a properly performed operation and a suitable apparatus when the patient is about this objection does not obtain. That I would perform a colotomy on every patient upon whom I had decided that a radical operation was inadmissible I will not say, but, rather, that I would strongly advise the operation as soon as any of the symptoms of the disease become so marked as to interfere with the comfort of the patient.

In cases of cancer of the rectum in which symptoms of obstruction are either present or impending, the hand of the surgeon is directed almost certainly to colotomy, for the general condition of the patient is totally opposed to the more severe operation, and the treatment to be aimed at is the relief of the immediate symptoms. That the case may be found suitable for extirpation after the obstruction has been relieved is quite possible, but usually the disease has reached too advanced a stage to render it admissible.

As a preliminary measure to the removal of the cancer, a previous colotomy is in my opinion a most useful adjunct. Although previously opposed to the subjection of a patient to more than one operation to relieve his troubles, the longer experience I have had in these operations has caused me to change my methods, so that now I am a strong advocate in favour of this preliminary operation, and should like here to make a digression to substantiate my views. It has been urged—

(a) That the performance of a preliminary colotomy makes an additional operation necessary, whilst the subsequent closure of the opening demands a third one to complete the case.

(b) That the colotomy may interfere with the manipulation of the bowel during the excision, and so prevent the proximal end from being brought down to the line of suture.

(c) That it does not guarantee asepsis in the operation wound, for, although the fæcal current may be diverted, the discharge from the growth contains pyogenic organisms.

Now, except for the additional operations, these objections in my mind carry very little weight. I can say at once that I have never found any shortening take place after a properly performed colotomy, so as to reduce the

rectal segment of the gut to any disadvantageous degree. That the fæces are prevented from entering the field of operation I consider most important, for in two of my cases in which a previous colotomy was not performed I had to contend with the catastrophe of having the wound flooded with fæcal matter during the operation, one of which died from septicæmia, whilst the other only recovered after long illness due to diffuse suppuration about the buttocks.

Not only, then, can this be prevented by a colotomy, but the lower segment of bowel can be more effectually prepared and freed from purulent discharge by efficient irrigation, maintained both through the distal opening of the gut and the anus. Further than this, I would add that it is not until the operation for extirpation of the growth is well advanced that the surgeon is sure that he can perform a complete rectorrhaphy or bring the proximal section of the gut down sufficiently to suture it to the anal margin; consequently, if an artificial anus has to be made at all, it is much better placed in the inguinal, than in the sacral, region for the convenience of the patient.

The actual operation of inguinal colotomy presents no difficulties, and, excluding the cases in which it is performed for obstruction, the mortality is very small. The time between its performance and the more severe radical operation can be very well spent in attention to the diet, efficient irrigation of the lower bowel, and efforts to bring the patient into a more satisfactory condition to withstand the shock of the operation. That there is any risk in allowing a fortnight to elapse between the two operations I would dismiss at once, for if a cancer is increasing so rapidly that fears are entertained that this interval would prejudice the prognosis, I think the case would be inoperable from the first.

Operative Treatment.—Excision of the rectum may be performed by the following methods :

1. By the trans-sacral route by some modification of Kraske's original method.
2. By the perineal route.
3. By the vaginal route.
4. By an abdominal operation.
5. By a combined abdomino-sacral operation.

Preparation of the Patient.—Before any of these operations, which are necessarily protracted, the patient should be under treatment for a week or two, if possible, to improve his general condition. Frequent feeds of milk, meat-extracts and digestible material should be given. Also careful attention to, and regulation of, the bowels by means of laxatives and repeated enemata. In my practice a patient takes an aperient pill each evening, followed in the morning by a saline draught. The bowel is irrigated two or three times daily for at least three days before the operation with a solution of potassium permanganate. Now, as has been mentioned above, I do not hesitate to advise a preliminary colotomy, and, when left in my hands, prefer to perform it about a fortnight before proceeding to the radical operation.

1. *Excision by the Sacro-coccygeal Route* is the method for choice when the growth exists in that part of the rectum between the third sacral vertebra and the anal canal. Since Kraske first introduced this method by removing a small piece of the left side of the sacrum, various modifications have been brought forward by different surgeons, the main feature of each being the position in which the sacrum is divided. More recently an osteo-plastic flap operation has been devised by Rydygier, in which the lower end of the sacrum and coccyx are turned back upon a hinge formed by the sacro-sciatic ligaments and replaced *in situ*

at the termination of the excision. Of this last operation I have personally no experience, and shall here describe the main features of the operation I am in the habit of performing. The whole area of operation having been cleaned and enveloped in an antiseptic compress on the day previous to the operation in the manner usual to all aseptic manœuvres, the patient is anæsthetized and placed either in an exaggerated left lateral position or in Littlewood's position, with the pelvis well raised and the lower extremities supported on a chair. The anal sphincter is stretched and the lower end of the rectum well washed out with sublimate solution.

A median vertical incision is then carried from the middle of the sacrum to just behind the anus, and deepened until the sacrum and coccyx are exposed. The amount of bone to be removed depends to a large extent upon the position of the growth as found at a previous examination, and in many cases the disarticulation of the coccyx alone suffices to leave enough room to excise the growth. If however, this is not thought sufficient, the soft parts are peeled off from either side of the sacrum and coccyx, and the ligaments attached to either side divided. The bone is then cleared on its anterior aspect with a blunt instrument, and the sacrum cut through with a chisel and mallet in a transverse direction and removed. I find a chisel more easy to work with than a saw, and certainly more expeditious. If any bleeding takes place during this manœuvre, it is now arrested, but difficulty may be met with in securing the middle sacral vessels, which retract under the bone and are difficult to seize. The tissues behind the rectum are now incised in a vertical direction until the levator ani muscle is reached, when the latter is divided on either side with scissors. With very little further separation of the peri-rectal tissues with the fingers,

the bowel is exposed and the upper and lower limits of the growth are sought for. It is well, however, not to attempt to dissect out the bowel too freely from its bed of peri-rectal fat, by which much bleeding is avoided, whilst the lymphatic paths from the growth remain undisturbed. Separation of the posterior and lateral walls having been chiefly effected with the aid of the finger, it remains to deal with the anterior. The upper part of the gut is drawn well down, clamped above the growth, and a transverse incision made with scissors into the posterior aspect of the bowel between the growth and the clamp. If the lower bowel has been effectually irrigated previous to the operation, and especially if a preliminary colotomy has been performed, no fæcal débris will be encountered. The division of the gut is continued upon each lateral aspect, any bleeding-points being caught in forceps as the incision is increased. Still continuing the incision around the bowel well above the growth, the peritoneal cavity may now be opened, but no abdominal viscera protrude owing to the position of the patient. A gauze plug, anchored by forceps, is placed in the opening into the peritoneal cavity, and the division of the rectum is completed; the lower segment is then gradually separated from above downwards from the pelvic viscera in front of it and turned back in the wound until the lower limit of the growth is reached, when the bowel is again cut through well below the disease. It is at this stage of the operation that the surgeon has to make up his mind as to the next procedure. The ideal method is, of course, to bring the divided end of the upper segment to that of the lower, and by direct suture of the two opposing openings to restore the lumen of the gut, thus leaving the anal canal intact. This can be performed provided that—

(a) The growth does not extend too low so as to involve the anal canal.

(b) That the two ends can be approximated without too much tension.

Failing the above, two courses remain open :

(1) If the distal segment of the bowel be too short to allow of direct suture, and if the proximal segment can be sufficiently brought down, the mucous membrane of the distal portion should be removed by a circular incision around the anal margin, leaving the external sphincter muscle; then the lower end of the proximal portion of the rectum may be drawn through the sphincter and sutured to the anal margin, thus leaving an anus in its normal position; or—

(2) The lower end of the proximal segment of the gut may be brought out and attached to the posterior incision, thus forming a sacral anus. When a previous inguinal colotomy has been performed, and the proximal segment cannot be brought down and united to the distal segment or to the anus, there is no reason why the proximal end of the gut should not be permanently closed and dropped back into the wound. I have stated above how preferable from the patient's point of view it is to have the artificial anus, if such be necessary, in the inguinal region rather than in the sacral. I have not yet had the opportunity to complete the operation in this way, but should a suitable case present itself I would certainly adopt it.

Returning now to the actual operation, the subsequent steps depend upon which procedure the surgeon is enabled to adopt. If rectorrhaphy is practicable, I first sew up the peritoneal cavity with fine silk, and then stitch the margin of the proximal portion of the gut to the margin of the distal segment, commencing always on the anterior aspect, and working round on either side with interrupted sutures passing through the whole thickness of the wall, mucous membrane included, and tying each suture on the

inner aspect of the gut. A second layer of sutures is put in if in any part of the incision the approximation appears to be weak. The whole area of operation is then irrigated with *lotio hydrarg. perchlor.*, 1 in 4,000. A large rubber tube 6 inches long is inserted into the bowel and the posterior wound sewn up, leaving efficient drainage by means of one or more rubber tubes or by strips of sterilized gauze.

I have in the above made no mention of the means taken to remove as far as possible any source of recurrence from the lymphatic paths draining the area of the growth. During the steps of the operation the fatty and cellular tissue in the sacral concavity should be removed as far and as freely as possible, as the lymphatic paths pass through it.

Failing a direct rectorrhaphy as above, an attempt should always be made to draw the proximal end of the gut down to the anal margin. If possible, the terminal inch of the anal canal should be left, but denuded of its lining mucous membrane, and the upper end drawn through it and sutured to the anal margin, when at all events an anus will be left in its normal position with a certain amount of control. In actual practice the cases in which this can be performed are few, owing to the difficulty in bringing down the upper segment, and also to the tension which must be borne by the sutures, causing the latter to cut readily through and render the operation ineffectual.

The formation of a sacral anus by bringing out the proximal end of the gut and suturing it to the margin of the cutaneous incision is a simple matter, and can be rapidly performed, the lower end of the rectum, including the growth, having been previously extirpated. As I have already said, the existence of a sacral anus is a trouble and annoyance to the patient. He has no con-

trol over the fæcal evacuation, and the opening is in such a position that it is difficult for him to attend to the cleansing and dressing of it. In this way a sacral anus compares very unfavourably with that of an inguinal colotomy, for here the opening can be directly looked after by the patient himself, whilst a certain amount of control is often afforded by the surrounding abdominal muscles, when the operation has been efficiently performed. This is a point I would particularly bring to the notice of surgeons, (and I would here again urge the performance of an inguinal colotomy as a preliminary to an operation for removal of a rectal carcinoma), for in the majority of cases the surgeon is unable to say which of the above procedures he will be able to adopt, until the operation is well advanced.

2. *Perineal Excision* for carcinoma recti is an operation now rarely performed. Before the introduction of the trans-sacral operation, perineal excision was performed for low-lying growths, but is now practically only used for growths which involve the anal margin, provided an extirpation is feasible, or for an epithelioma of the anus. In those cases in which some 2 inches of healthy tissue is found between the lower limit of the growth and the anal margin, I have stated above that the posterior operation gives a much more satisfactory opening through which to reach and extirpate the growth.

The operation is so well known that a detailed description of it here is unnecessary. Let it suffice for me to impress upon intending operators the necessity of efficient drainage of the perineal wound, and the comfort to the patient of a rectal tube inserted well into the bowel at the termination of the operation to allow the passage of flatus, especially as it is most probable that a preliminary colotomy has not been performed in such case.

3. *The Vaginal Route.*—During recent years removal of rectal cancer through the vagina has been practised, and is useful in cases of early growth in the lower end of the rectum. The vagina is first thoroughly douched, and the anterior lip of the os uteri seized in volsellum forceps. An incision is then carried along the posterior wall of the vagina, and deepened below into the perineal space until the external sphincter is reached. If the vaginal wall is not infiltrated by the rectal growth, it is easily peeled back on either side and the bowel exposed; but if infiltration has commenced, the affected part should be enclosed in an elliptical incision and ultimately removed. The bowel is now freely exposed, and the peritoneal reflection at the bottom of Douglas's pouch may or may not be opened, according to the situation of the upper limit of the growth. The levator ani muscle of each side is divided, and the extent of the growth accurately determined, whilst the fatty tissue between it and the sacral concavity, in which are contained the lymphatic tract and glands, are removed. The tissues surrounding the bowel above the growth are separated with the fingers to enable the upper segment to be brought down, especial care being taken to avoid injury to the superior hæmorrhoidal artery at the posterior aspect of the growth.

It remains now to determine whether a direct rectorrhaphy can be performed, or whether the operation must be completed by bringing down the upper segment and attaching it to the anal margin. If the former, the growth is extirpated by division of the bowel above and below the growth, well clear of the edge of the latter, care being taken to prevent any extravasation of rectal discharge into the wound. The anterior wall of the lower segment is then divided in its long axis for an inch or so to facilitate the circular suturing of the two ends, which is begun at

the posterior aspect and continued round on each side, taking up all the coats of the bowel with interrupted catgut sutures and tying them on the inner aspect of the bowel. Finally the small vertical incision is sutured, and the posterior vaginal incision closed over it, free drainage being employed below, and a rectal tube passed well in through the anal canal.

Should, however, conditions be such that a direct rectorrhaphy cannot be completed, owing to lack of tissue in the lower segment to provide a satisfactory stump for suture, the operation can be completed by removal of the mucous membrane of the lower segment down to the anal margin and invaginating the upper segment bodily through the collar thus formed, and anchoring it by direct suture to the anal incision. The vaginal opening is finally closed by suture along its posterior wall. By this means an anus is formed in its natural position, and a certain amount of fæcal control returns within a short time of the operation.

4. *Excision through a Laparotomy Wound.*—In cases of carcinoma of the upper portion of the rectum, it is sometimes impossible to gauge the extent of the growth by bimanual palpation, even under the influence of an anæsthetic. The lower end of the growth may be just within reach of the finger, or may be seen with the proctoscope, but it becomes almost impossible to say whether it has reached too advanced a stage to preclude its excision without further means of examination. It is in these cases, where a preliminary colotomy is refused, that I am in the habit of advising an examination through a laparotomy incision, having gained the patient's permission to proceed to a radical operation if the latter be practicable. The abdomen may be opened either in the middle line or in the left inguinal region, and the selection of the one

over the other rests, to my mind, upon the possibility of extirpation or otherwise. If I think that from the symptoms given in the particular case, and from its history, there is a chance of excision of the growth, then I prefer to operate in the middle line, for by this route the necessary manipulation in the pelvis is more easily carried out; but if, on the other hand, there is a doubt as to the feasibility of eradicating the disease, then I would explore through an incision in the left inguinal region, by which the growth can be thoroughly examined, enlarged glands can be sought for, and, should the condition be found too advanced to allow of extirpation, an inguinal colotomy can be performed without the necessity of a second incision.

The abdomen being opened, the surgeon seeks for the growth, defines its limits and mobility, and at the same time examines the lateral pelvic walls for any lymphatic extension of the disease. Rarely will it be found that a growth affecting the rectum proper can be excised and the ends of the gut joined by end-to-end anastomosis, as can be done in the sigmoid flexure, unless an abnormally long meso-rectum be present, owing to the difficulty in applying sutures to the distal end so deep in the pelvis; but should a case present itself suitable for this method, it might certainly be attempted, for in this part of the rectum the bowel is surrounded by peritoneum.

5. In most cases, however, the surgeon is more likely to find that such anastomosis is impossible, but yet the growth has not advanced too far to prevent its removal. In such cases as these a *Combined Abdominal and Trans-sacral Operation* may be performed. Through an abdominal incision the bowel affected by the carcinoma is drawn up and the mesentery attached to it is ligatured by several interlocking ligatures close to its parietal reflection. The

portion of the bowel well above the growth is then divided between two stout ligatures, the proximal end drawn out through a left inguinal incision and sutured in position to form an artificial anus in this situation. The distal end, having been meanwhile separated as far as possible from the surrounding tissues from above, is wrapped in sterile gauze and dropped back into the pelvis, after which the abdominal incision is closed. The patient is then turned over into an exaggerated left lateral position, and a trans-sacral operation performed as described above, the divided portion of bowel being brought out through the posterior incision and amputated, the opening remaining in the gut being closed by firm sutures. The sacral cavity left by removal of the growth is drained through the sacral incision, which is only partially closed to allow of this. This extensive operation is necessarily severe, and in my series of cases I have not met with one demanding it. It is interesting, however, to note here the result obtained by Quénu in sixteen cases operated upon by this method: of eight women, seven recovered and one died; of the men, one recovered and seven died, notwithstanding the fact that there seemed to be no great disparity in the gravity of the cases before operation (Tuttle).

Treatment after Operation.—If, as has been advised, a preliminary colotomy has been performed, and the fæces thus directed from the area of operation, the treatment of the lower bowel is much simplified. The patient is kept upon the side in order to prevent undue pressure upon the wound in the sacral area and the treatment is mainly that of the prevention of shock and regulation of the diet. However, some patients remain in whom a previous colotomy has not been done, when the surgeon will have to direct his treatment to the local condition. In these cases I invariably make use of a rectal tube of 1 inch

diameter, passed well into the rectum and secured by a suture, so as to allow the passage of flatus and of any liquid discharge from the rectum. The tube remains *in situ* for three days, when, a saline purge having been given some three hours previously, an oil or glycerine enema is thrown into the rectum and the tube removed. The patient is directed to avoid straining during defæcation, so as to prevent undue tension on the sutures. The immediate treatment after the operation is similar to that after any operation, and it must be remembered that these patients are liable to considerable shock. Morphia is generally necessary during the first two days, but is to be given sparingly. Stimulants may be required at first, and I am in favour of giving large amounts of fluid by the mouth as soon as the effects of the anæsthetic have gone off. The skin incision is dressed twice daily, and the drainage-tubes gradually shortened and finally removed about the third or fourth day.

If a preliminary colotomy has been performed and the growth has been successfully removed so that a normal anus remains, it becomes necessary to consider the advisability of the closure of the artificial opening. About two months ought to be allowed to elapse before this last operation is performed.

Complications.—The complications met with in performing the operation for the removal of a rectal cancer may be classed as immediate and remote.

Hæmorrhage during the operation, though often considerable in the perineal operation, is comparatively small in the trans-sacral route, provided that the operation is conducted on the lines given above. The hæmorrhage from the peri-rectal tissues is easily controlled by ligature, whilst the care taken in separating the rectum posteriorly close to the sacrum prevents injury to the superior

hæmorrhoidal artery. The middle sacral vessels may occasionally give some trouble, as they are difficult to pick up, retracting after division. The actual incision of the wall of the bowel is always attended by some bleeding, but by proceeding slowly and picking up each vessel as it is divided, any excessive loss is prevented. Each vessel divided should be secured as the operation proceeds, whilst the oozing in the separated tissues on either side of the rectum is arrested by the gauze plugging used whilst the repair of the divided gut is proceeding.

The escape of fæcal material into the wound is a most serious accident during the removal of a rectal growth. In two cases in which this unfortunate accident happened in my own practice, owing probably to insufficient preparation of the patient, one died of sepsis, whilst the other recovered after a convalescence rendered very tedious from prolonged suppuration about the buttocks. Nothing is more distressing to the surgeon than to face this catastrophe, and in consequence I most seriously advocate a colotomy before proceeding to the major operation, as otherwise, it is most difficult to insure that fæcal contamination will be eliminated. When one remembers that the peritoneal cavity is in many cases of rectal extirpation laid freely open, the danger of infection by fæcal extravasation can be realized, so that the time spent in the efficient preparation of the patient is in no-wise time wasted. Whether the bowel is not divided until the peritoneal cavity has been again closed by accurate suturing, sufficient separation having been obtained, or whether the peritoneal cavity is shut off by gauze packing, must rest with the practice of individual surgeons, but to my mind the prevention of fæcal escape by previous preparation is the more important means upon which to rely. The pelvic cellular tissue around

the rectum must also be protected from septic contamination, or suppuration may ensue and vitiate the result of the operation, even when the peritoneum has remained undivided.

Injury to other pelvic organs may occur from too rough a manipulation of the tissues, especially where separation of the rectum is attempted by tearing rather than by clean incision. I have found it much easier to separate the rectum from the bladder base, prostate and urethra by removing the lower segment from above downwards after division of the rectum above the growth, with, if necessary, the introduction of a metal sound into the bladder to assist in the recognition of these organs. In some recorded cases the bladder, and even the ureters, have been injured, thus increasing the gravity of the operation.

Post-Operative Complications.—The most common complication resulting from the operation is sepsis in the wound, with the formation of a discharging sinus. Whether occurring from fæcal extravasation or faulty technique, the result of sepsis is to prolong the convalescence of the patient and is a troublesome event when the age of the patient is considered.

Deficient blood-supply to the intestine may cause gangrene of the gut at the seat of operation, and may be brought about by—

1. Too much tension upon the sutures from insufficient length of the upper segment.
2. Injury to the superior hæmorrhoidal artery during the separation of the upper segment (*vide* Tuttle).
3. Sepsis.

Whatever the cause, sloughing of the gut may occur within a few days of the operation, causing fæcal extravasation into the peri-rectal space, with subsequent breaking down of the posterior wound.

Incontinence of fæces is a somewhat frequent complication after extirpation of the rectum, and depends largely upon the interference with the sphincter muscles or the nerves supplying them. Where the surgeon is able to perform the resection well above the anal canal, this complication is less frequent, but where this portion is encroached upon, or where an artificial anus is established, incontinence is usual. Various methods of twisting the gut in its long axis, or of bringing the proximal end through the fibres of the gluteus maximus muscle have been attended with more or less success; but I find that the incontinence often decreases as time elapses and the patient will acquire a certain amount of fæcal control.

Stricture of the rectum may occur after this operation, either at the site of the rectorrhaphy or at the sacral anus. In more than one case under my own care, a small fæcal fistula remained after suppuration in the posterior wound of a trans-sacral excision of the rectum, immediately above the site of resection, and was accompanied by a cicatricial contraction of the gut where the junction had been effected, particularly on the anterior aspect. The stricture was treated by linear proctotomy and the small posterior fistula rapidly closed. Most cases of rectal excision are benefited by the occasional passage of a bougie.

Prolapse of the gut may occur, especially after the formation of an artificial anus in the sacral area through an excessively patulous opening, and is an annoyance to the patient owing to the constant discharge of mucus from the congested lining membrane. It may require operative treatment, as in prolapse of the rectum through the anus, either by excision of the prolapsus or by a partial closure of the anus on the lines of Lawson Tait's operation for the repair of a ruptured perineum. I have in two cases carried this out successfully.

Pain at the seat of operation occurred after an excision of the rectum in one case in my series, and was very severe, though there was no recurrence of the growth. This pain was due to cicatricial contraction which followed the formation of a sacral anus, was only relieved temporarily by subcutaneous division of dense fibrous bands, and I had to fall back upon the physician's refuge—viz., morphia.

Results.

The results obtained from the above described procedures vary considerably with the method employed, and naturally, the immediate mortality is higher with the more extensive operation. The choice of any particular operation, however, does not rest entirely with the surgeon, but is to a large extent influenced by the position of the growth; for whilst those situated in the lowest portion of the rectum can be removed by a perineal operation, those placed higher must be approached by a coccygeal or trans-sacral operation, with possibly the necessity of a preliminary abdominal section. In the cases collected from literature, it has been shown by Tuttle that the mortality from the various methods of operation may be tabulated as follows:

<i>Method.</i>	<i>No. of Cases.</i>	<i>Deaths.</i>	<i>Mortality.</i>
Sacral	913	211	23·1 per cent.
Perineal	569	76	13·5 „
Abdominal	49	18	36·7 „
Combined	22	9	40·9 „

—from which it will be seen how comparatively low is the percentage of deaths from the perineal operation.

I have collected the cases in my own practice, amounting consecutively to forty, down to October, 1903, leaving out the more recent ones, so as to arrive as far as

possible at the ultimate results. Though fully realizing that this is a small number from which to attempt to draw any definite statistics, yet I think the experience I have gained from this series may be of use to other operating surgeons and is my excuse for now bringing it forward.

In this series of forty cases, all were operated upon by the posterior operation, the coccyx and as much of the sacrum as was found necessary being removed to insure sufficient room for the subsequent manipulations during the removal of the growth. In the tabulated list appended, brief notes are made of the duration of symptoms, character and extent of the growth, and the features of each operation performed. The large majority of these cases occurred in hospital practice and I have found it extremely difficult to keep in touch with several of them, and though many have been seen from time to time, others remain of whom no trace can be found. Thus, five cases out of the forty have been completely lost sight of, whilst five more were only traced up to a year after the operation, when they ceased their visits to the hospital and subsequent communications sent to them have failed to elicit any response.

Of the remaining cases, thirteen are known to be in *good health*: one after ten years, two after four years, three after three years, four after two years, and three recent ones after one year from the time of the operation. *Recurrences* were found in fourteen cases, occurring in one case after eight years, though I am rather more inclined to look upon this as a coincidence rather than a true recurrence. Curiously, it was in the first patient upon whom I operated by the posterior operation, and he remained in good health until a small growth was found in the same situation and removed eight years after the

radical operation was performed. Of the other cases, the recurrences were noted in one case after four years, in another after three years, whilst in eight recurrence was found during the second year after operation, and in the remaining three within the year after the primary growth had been removed.

Three cases *died* from the immediate effects of the operation, making a percentage mortality in the forty cases of 7.5 per cent.; one from peritonitis, a second from septicæmia, in which a copious extravasation of fæces flooded the wound during the operation, and the third from bronchitis and a failing heart four days after the operation.

Colotomy.

I have so many times alluded to an inguinal colotomy in the foregoing pages that I wish to add a few lines upon the performance of the operation. Numerous methods of performing the operation have been devised, and are so well known that I shall merely content myself with describing the operation that I am in the habit of performing myself, having found it most satisfactory in every way.

The area of operation having been previously shaved and prepared, an incision is made through the skin and fascia in the left inguinal region, parallel to Poupart's ligament and about $1\frac{1}{2}$ inches above it, the middle of the incision being placed opposite the anterior superior iliac spine. The external oblique fibres are exposed and split in the direction of the wound for its whole length; these being retracted, the fibres of the internal oblique muscle, passing almost transversely across the wound, are brought into view and again separated by a blunt dissector in the direction of the fibres, and the two margins thus formed

well retracted. The fibres of the transversalis muscle are separated in the same manner, and the transversalis fascia is incised in the long axis of the wound, when the peritoneum is reached. In this manner the abdomen can be opened without incising any of the muscular layers, a point of much importance, for the artificial anus is surrounded by muscular fibres which tend to close the opening upon any action of the abdominal muscles and thus the patient commands a certain amount of control over the opening. The bleeding-points having been secured by twisting or ligature, the peritoneum is incised in the long axis of the wound, the edges being caught and held up in clamp forceps. The peritoneal cavity is thus opened, and my next procedure is to explore the pelvic cavity to ascertain the exact position of the upper limit of the growth and to search for any lymphatic extension along the lateral pelvic walls.

Having ascertained these details, the sigmoid flexure is defined and the loop brought out into the wound. The upper or proximal end is carefully recognised from the lower, and traction made upon it until it is fairly taut, the lower end being meanwhile paid back into the abdominal cavity, so that the lower end of the bowel is not made inconveniently short should a resection of the bowel be contemplated; and the chance of a subsequent prolapse of the gut at the inguinal anus is minimised. The loop of gut being now held up from the wound between the fingers of an assistant, the blunt end of a pair of compression forceps is pushed through its mesentery, and grasping the free ends of two stout silk sutures is withdrawn, thus carrying the sutures with it below the intestine. The two ends of the sutures on each side of the gut are threaded on fully curved Hagedorn needles and are passed through the whole thickness of the ab-

dominal wound on each side, in such a manner that one emerges through the skin at about half an inch from the incision and the other in the same plane about a quarter of an inch from the first. These sutures on the one side of the wound are next tied over a piece of small rubber tubing placed parallel to the wound, and then similarly the sutures on the other side of the wound are tied, some considerable tension upon them being applied, so that in reality a mattress suture is formed and a strong spur of tissue is implanted under the gut, which rapidly forms adhesions owing to the approximation of peritoneal surfaces to each other. This is the method I have adopted for some years, and can recommend it not only for its simplicity, but for the rapidity with which it can be performed. Each end of the gut is anchored to the wound by a fine silk suture passing through the abdominal wall of either side and through the longitudinal muscular band of the intestine, and finally the appendices epiploicæ are ligatured and removed, as otherwise they become œdematous and in the way. A suture may be necessary at either end of the wound. No other sutures are used to join the peritoneal surface of the gut to the parietal peritoneum unless it is proposed to open the gut at this operation. I prefer, if possible, to defer opening the gut until the second day after the operation, when I incise it longitudinally if it is desired that the opening remain permanent, or, if only temporary, by a T-shaped opening, one incision passing transversely across the gut, and the other in its long axis, thus leaving a flap of intestinal wall covering the lower segment.

In some cases in which an inguinal colotomy is performed, as, for instance, in intestinal obstruction, the intestine has to be opened during the performance of the operation. In these cases the procedure above described

is adopted, but a row of sutures is used to join the peritoneal surface of the gut to the parietal peritoneum on each side of the gut. A purse-string suture is then inserted into the convexity of the loop and the intestinal contents driven away from the piece by pressure of the fingers. An incision is then made into the lumen of the gut within the suture and a Paul's tube inserted and retained in position by tying the purse-string, the distal end of the tube being attached to a thin rubber tubing of large calibre to convey the intestinal contents into a convenient receptacle, and the wound dressed in the usual way.

The following table gives a brief epitome of forty consecutive cases of trans-sacral excision of the rectum, of which the first fourteen were published in the Transactions of the Medical Society (vol. xx.), as an appendix to a paper entitled 'The Removal of High-lying Cancer of the Rectum by Kraske's Method.'

TABLE OF CASES

No.	Date.	Sex.	Age.	Duration of Symptoms.	Extent of Disease.	Bone removed.	Peri- toneum opened.	Recto- rhap- hy.	Result.	Subsequent Condition.
1	Feb., 1891	M.	61	12 mos.	Four inches of growth round entire circum- ference.	Coccyx	No	No	Good	Remained in good health for eight years, when a small local recurrence was found and re- moved. Recurrence after one year.
2	Dec., 1892	F.	50	—	Extensive annular growth. Glands in- volved.	Coccyx	No	No	Good	
3	Feb., 1893	M.	53	—	Four inches of rectum involved.	Coccyx	Yes	No	Death	Peritonitis proved fatal on the 9th day.
4	Aug., 1894	M.	50	9 mos.	Annular growth up to mid-sacral region.	Sacrum and coccyx	Yes	Yes	Good	Rectorrhaphy failed. No recur- rence up to 1897.
5	Sept., 1894	F.	50	5 mos.	Growth of size of five- shilling piece limited to dorsum.	Coccyx	No	No	Good	In good health in Oct., 1904.
6	July, 1895	M.	52	1½ mos.	On right side, from 2 in. above anus to sacrum.	Coccyx	No	No	Recur- rence	Further excision. Again re- curred within a year. Subse- quent colotomy.
7	Aug., 1895	M.	50	6 mos.	In anterior two-thirds of rectum from 2½ in. to 4½ in. above anus.	Coccyx	Yes	No	Good	Neuralgia and prolapse. No recurrence. Died after four years.
8	Sept., 1895	M.	62	10 mos.	Five inches of rectum removed.	Sacrum and coccyx	Yes	No	Good	Lost sight of. Growth was a scirrhous carcinoma.
9	April, 1896	F.	48	9 mos.	Limited to dorsum ; extended from 1½ in. to 2½ in. up.	Coccyx	No	No	Good	No recurrence in a year. Lost sight of after.
10	April, 1896	F.	42	Recur- rence after perineal excision 2 yrs. previously	Growth reached to sacro-coccygeal level.	Sacrum and coccyx	Yes	No	Good	No recurrence after one year. Cannot be traced since.
11	May, 1896	M.	63	12 mos.	Extensive growth. Anus involved.	Coccyx	No	No	Good	Was comfortable after one year.
12	Sept., 1896	M.	55	4 mos.	Extended to 3 in. above anus.	Sacrum and coccyx	Yes	Yes	Good	Normal anus in Sept., 1897. Lost sight of since.

TABLE OF CASES—continued

No.	Date.	Sex.	Age.	Duration of Symptoms.	Extent of Disease.	Bone removed.	Peritoneum opened.	Rector-rhaphy.	Result.	Subsequent Condition.
13	Oct., 1896	F.	64	24 mos.	Growth encircled gut and extended to mid-sacrum. Enlarged sacral gland.	Sacrum and coccyx	Yes	No	Death	Had chronic bronchitis and dilated heart. Died of exhaustion on fourth day.
14	Feb., 1897	F.	60	9 mos.	Complete ring of growth for 2 in., commencing 2 in. above anus.	Sacrum and coccyx	Yes	Partial	Good	Slight sacral necrosis in a month. Recurrence of growth in four years, for which colotomy was performed. Died in 1902. Notes are mislaid.
15	Feb., 1898	F.	—	—	—	—	—	—	Good	Cannot be traced.
16	March, 1898	—	—	—	—	—	—	Yes	Good	Recurrence in eighteen months. Colotomy.
17	May, 1898	M.	50	—	—	Sacrum and coccyx	—	Yes	Good	Recurrence in Sept., 1899. Nothing known since.
18	Sept., 1898	M.	29	—	—	—	—	—	Good	Sacral anus. Colotomy for contraction two years later. Died Aug. 26, 1901.
19	Aug., 1899	M.	58	2 mos.	Cauliflower-like growth.	Sacrum and coccyx	—	No	Good	Recurrence in six months. Colotomy in June, 1901.
20	Sept., 1899	M.	53	4 mos.	High-lying.	Sacrum and coccyx	No	Yes	Good	Left 1 in. of mucous membrane anteriorly. Died June, 1902. Recurrence in 1904.
21	March, 1900	M.	53	12 mos.	—	Coccyx	No	No	Good	Died with recurrence in <i>situ</i> Sept., 1902.
22	Oct., 1900	M.	62	6 mos.	Four inches removed.	Coccyx	No	No	Good	Anus in normal position and was quite well when seen in Oct., 1904. Died of cerebral hæmorrhage Dec. 5, 1904.
23	Jan., 1901	M.	59	6 mos.	Post-rectal glands were involved.	Sacrum and coccyx	—	Yes	Good	Died with local recurrence in Aug., 1901.
24	Jan., 1901	M.	43	5 mos.	Annular growth.	Coccyx	No	No	Good	Recurred in a year.
25	Feb., 1901	F.	60	8 mos.	Three inches.	Coccyx	Yes	Yes	Good	
26	Feb., 1901	F.	—	4 mos.	High-lying growth.	Sacrum and coccyx	No	—	Good	

27	June, 1901	M.	54	18 mos.	Semicircular growth 2½ in. up from anus.	Coccyx	No	Yes	Good	No recurrence in Oct., 1904. Some pain at anus.
28	March, 1902	F.	57	6 mos.	Annular growth, lower border, 1½ in. from anus.	Sacrum and coccyx	Yes	Yes	Good	No recurrence, Oct., 1904. Uses normal anus. Small posterior fistula.
29	April, 1902	M.	59	2 mos.	Four inches of bowel removed.	Coccyx	No	No	Good	Sacral anus.
30	June, 1902	F.	41	8 mos.	—	Sacrum and coccyx	Yes	Yes	Good	Died April, 1903.
31	Sept., 1902	F.	55	4 mos.	—	Coccyx	Yes	Yes	Good	Recurrence after fourteen months; removed. Died with further recurrence Oct., 1904.
32	Nov., 1902	M.	—	—	—	—	—	Yes	—	Notes mislaid and cannot trace.
33	Nov., 1902	F.	42	3 yrs.	Large growth.	Coccyx	No	No	Good	Recurred twice, and later anus removed. No further recurrence, Jan., 1905. Condition satisfactory.
34	Nov., 1902	M.	65	6 mos.	Large growth.	Sacrum and coccyx	No	No	Died	Copious action of bowels during operation. Death from septicæmia.
35	Nov., 1902	M.	46	12 mos.	Two and a half inches from anus.	Coccyx	—	Yes	Good	Use of normal anus. Quite well Oct., 1904.
36	March, 1903	M.	50	—	Complete circle 2½ in. wide.	Sacrum and coccyx	Yes	Yes	Good	No recurrence, Feb., 1905.
37	May, 1903	M.	64	—	Glands involved.	Sacrum and coccyx	Yes	Yes	Good	Quite well, with no recurrence, Jan., 1905.
38	July, 1903	F.	73	12 mos.	Surrounds bowel from just above sphincter.	Sacrum and coccyx	No	No	Good	Patulous sacral anus. No recurrence, Dec., 1904.
39	Aug., 1903	M.	53	2 yrs.	Complete circle 2½ in. wide.	Sacrum and coccyx	No	Yes	Good	Prolonged convalescence from suppurative abscess of buttocks. Action of bowels during operation. No recurrence, Oct., 1904.
40	Oct., 1903	F.	32	2 mos.	Large growth extending high up.	Sacrum and coccyx	Yes	Yes	Good	Preliminary colotomy. No recurrence, April, 1905. Artificial anus satisfactory.

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